Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Recommendations Approved by World Radiocommunication Conference Advisory Committee	)	IB Docket No. 16-185

COMMENTS OF INMARSAT, THALES, SES AMERICOM

Inmarsat, Thales and SES Americom (collectively "ESIM Proponents") submit these comments in response to the Public Notice issued by the International Bureau on October 3, 2018 in above captioned proceeding (the "PN").[1] The PN seeks comments on the draft recommendations provided by the World Radiocommunication Conference Advisory Committee ("WAC"), which are contained in Attachment A, and draft proposals provided by the National Telecommunication and Information Administration, which are contained in Attachment B. These issues will be considered by the 2019 World Radiocommunication Conference ("WRC-19").

Introduction

The ESIM Proponents comments, herein, are limited to proposals addressing WRC-19 Agenda Item 1.5 contained in Attachment A of the PN (see Document WAC/068). Consensus was not reached on this agenda item and there are three proposals, reflected as View A, View B and View C, which are included in the PN along with a cover page with narrative

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1 *See International Bureau Seeks Comment on Recommendations Approved by World Radiocommunication Conference Advisory Committee*, Public Notice, IB Docket No. 16-185, DA 18-1017 (October 3, 2018) ("*PN*").

justifications for each view. Although the ESIM Proponents disagree with many of the assertions in the cover page of Views B and C we limit our comments to the actual View B and View C proposals.

WRC-19 Agenda Item 1.5 is to '*consider the use of the frequency bands 17.7-19.7 GHz (space-to-Earth) and 27.5-29.5 GHz (Earth-to-space) by earth stations in motion communicating with geostationary space stations in the fixed-satellite service and take appropriate action, in accordance with Resolution* ***158 (WRC-15)****'.* The ESIM Proponents support View A which would provide additional spectrum to support important and growing global broadband requirements and also assure protection of existing services.

The ESIM Proponents would first like to point out that there are areas where the proposals of the three Views align and thus areas were the Commission does have consensus proposals. In particular the ESIM Proponents note the following:

1. All three Views support Method B of the CPM Report, which is to adopt a footnote to Article 5 of the Radio Regulations (RR) and an associated WRC Resolution that would contain the technical and regulatory conditions for the operation of all three types of Earth Stations in Motion (ESIM) – aeronautical (A-ESIM), Maritime (M-ESIM) and Land (L-ESIM).

2. For M-ESIM all three Views propose a minimum distance from the low-water mark as officially recognized by the coastal State of 60 km where the M-ESIM can operate without the prior agreement of that administration and a maximum M-ESIM EIRP spectral density towards the territory of any coastal State of 24.44 dBW in a reference bandwidth of 14 MHz or an equivalent EIRP in a 1 MHz reference bandwidth. Prior agreement of the concerned coastal State is required to operate within the minimum distance or at a higher EIRP spectral density level.

3. For A-ESIM all three Views propose a power flux density (PFD) on the ground to protect terrestrial service. Views A and C propose the same PFD mask and View B proposes a significantly more stringent mask, which is discussed further below.

4. All three Views propose the same limits for the protection of NGSO FSS systems in Annex 1 of the example Resolution and apply those limits in the same frequency range, 27.5-28.6 GHz.

5. All three Views propose the same provisions for Annex 3 of the example Resolution.

The following comments on View B and View C highlight the main differences between those proposals and the one contained in View A and why the Commission should go forward with View A as the US proposal. The ESIM Proponents note that the proposal on agenda item 1.5 covers a wide range of regulatory matters as well as outlining guidelines for administrations and there have been many discussions on these topics in the ITU-R. These are reflected in other less significant differences in the View B and View C proposals compared to the View A proposal. To address these differences the ESIM Proponents would urge the Commission to include the stakeholders in finalizing the agenda item 1.5 proposal. This will allow the Commission to have a fuller understanding of all the discussions that have taken place in the ITU-R and have a comprehensive U.S. proposal that will reflect the main results of those ITU-R discussions.

Comments on View B

The most significant difference between View A and View B is the proposed PFD mask for A-ESIM to protect terrestrial services in the band 27.5-29.5 GHz, where the mobile service (MS) and fixed service (FS) are allocated on a co-primary basis with the Fixed Satellite Service (FSS).

To protect terrestrial services from A-ESIM transmissions View B proposes the PFD mask included as Option 2 in the CPM Report and View A proposes the PFD mask included as Option 1 in that Report. It is noted that *none of the Views* propose the Option 3 PFD mask, which is even more unnecessarily restrictive than the Option 2 mask.

The Option 1 PFD mask was developed and agreed after extensive analysis within Europe and has been implemented for five years without any issues of interference. Additional

analysis presented to ITU-R WP4A has shown that this mask is sufficient to protect both the FS and MS. In the CPM Report, the Option 2 PFD mask, contained within the View B proposal, includes the following Note – "this potential pfd mask applicable to aeronautical ESIM for the protection of terrestrial services is still under consideration and may be revised." The reason for the Note is that the analysis used to derive the Option 2 PFD mask did not take into account the -10 degree mechanical down-tilt and maximum +7 degrees electronic beam steering that was specified in the defined set of MS system characteristics to be used in sharing analyses liaised to WP 4A from the ITU-R expert group (WP5A). If the WP5A information is taken into account in the analysis, the resulting PFD mask would be no more restrictive than the Option 1 PFD mask proposed in View A. In addition to not taking into account the base station antenna characteristics specified by WP5A the Option 2 PFD mask was derived using a static analysis based on constant worst-case alignment between the A-ESIM and the base station antenna and a protection criterion of I/N=-6 dB for all percentages of time. The analysis underlying Option 2 did not make any consideration for short term and long-term protection nor probability of interference, which makes the study very conservative and unrealistic since the A-ESIM would be in motion and the base station antenna is expected to use dynamic beamforming. Furthermore, the proposed protection criteria of I/N = -6 dB for all time percentages will unnecessarily constrain the frequency sharing between the MS and FS and FSS, or between different mobile services applications, since the protection criteria does not take into consideration the unavailability of mobile service applications within the 27.5-29.5 GHz band due to propagation effects.

The View B also fails to include in the proposed WRC Resolution resolves 1.2.5, which was included in View A as shown below:

1.2.5 any transmitting aeronautical or maritime ESIM that conforms to the requirements in Annex 2 to this Resolution shall be deemed to have met its obligation to terrestrial stations under *resolves* 1.2.2 above;

Without such a resolves ESIM operators would not have the assurance, on an international level, that operation in accordance with the Resolution would be deemed to be compatible with terrestrial services. Inclusion of this resolves does not obviate the right of an administration to license ESIM on its territory, territorial waters or national airspace or to impose additional constraints in the ESIM license as that administration deems necessary for operations within its jurisdiction.

Additionally, Part 2 of Annex 2, which includes the A-ESIM PFD mask to protect terrestrial services, of the View B proposal omits Note 1 as shown below, which provides guidance to administrations on what factors *should* be considered in calculating the A-ESIM PFD level.

NOTE 1 – When calculating whether an ESIM meets the pfd levels specified in provision 1.1 above, free-space propagation, atmospheric absorption, and any attenuation due to the aircraft fuselage should be considered.

This Note was discussed in detail during the ITU-R WP4A meetings and there was agreement that it is an important element and is contained as part of the Method in the CPM Report and should be included in the U.S. proposal.

Comments on View C

The most significant difference between View A and View C is that the proposal in View C would exclude ESIM operations from certain portions of the 27.5-29.5 GHz and 17.7-19.7 GHz frequency bands. The reason for excluding certain bands is stated to be that "ESIM are either expressly excluded from operation in a Region, or portions of the Resolution 158 (WRC-15) reference spectrum is not available in an administration". In the proposed WRC Resolution,

the sole View C proponent refers to the frequency plans in the United States and Europe in newly proposed *further considerings*. For example *further considering (c)* states ECC Decision 13(01) prohibits EISM use of the 29.1-29.4525 GHz band but this is not correct, as this ECC decision allows ESIM to operate in this band subject to conditions (see Decided 3.d of ECC Decision (13)01) . The stated reason for excluding frequency bands in the View C is further contradicted as the proposal does not implement the above reasoning, but simply excludes most of the FSS bands that are available for NGSO MSS feeder links. NGSO MSS feeder links may be operated in the 29.1-29.5 GHz frequency, under the FSS allocation, subject to coordination under Article 9 of the RR with other FSS operations. There is no basis to exclude ESIM communication with GSO FSS space stations from this bands. Moreover, the Commission in its Report and Order on the use of ESIM communicating with geostationary orbit space stations ('ESIM R&O')[2] adopted rules to allow ESIM to operate in the 29.25-29.5 GHz frequency range, so adopting the exclusion in the RRs as proposed in View C would place the US proposal at odds with its own rules.

The View C narrative continues to argue that ITU-R studies are on-going and have not been completed because of the 'complexity' of the interference environment between A-ESIM and NGSO MSS feeder links. However, after maintaining a place holder throughout the entire ITU-R study cycle to address this issue, there have been no ITU-R studies submitted on the need for additional measures to protect NGSO MSS feeder links above those which are advocated in

[2] *IB Docket 17-95 Amendment of Parts 2 and 25 of the Commission's Rules to Facilitate the Use of Earth Stations in Motion Communicating with Geostationary Orbit Space Stations in Frequency Bands Allocated to the Fixed Satellite Service.*

View A -- that ESIM operate within the envelope of the GSO FSS network with which it communicates. This is the same conclusion reached by the Commission in the recently adopted ESIM R&O where the Commission specifically stated in paragraph 56 that "We find that coordination under Section 25.258(a) will provide Iridium with sufficient interference protection".[3] It is further noted that the off-axis e.i.r.p. limits proposed in Annex 1B of the WRC Resolution that is part of the View C proposal are so restrictive that ESIM would not be able to operate. In fact, no GSO FSS earth station would be able to operate under those limits, which further illustrates that the View C proposal is excessively restrictive since GSO FSS earth stations have successfully coordinated with NGSO MSS gateways in the past, despite operating well above the limits proposed by View C. As the Commission decided in the ESIM R&O, there is no need for any additional measures for ESIM operations to protect NGSO MSS feeder link operations above and beyond the already required coordination between NGSO MSS feeder links and GSO FSS networks.[4] Consequently, the first set of *resolves* 1.1.7 and 1.1.8 in the View C proposal should not be included. The ESIM Proponents also note that all the further *recognizings* included in View C are completely unnecessary. There was no discussion at any of the ITU-R WP4A meeting on these further *recognizings*, and thus these are not included in the CPM Report and should not be included in the U.S. proposal.

Conclusion

In the ESIM R&O the Commission recognized that the ESIM market is growing and adopted rules to allow ESIM to operate in additional frequency bands as well as to promote

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[3] *See Docket 17-95 Report & Order and Further Notice of Proposed Rulemaking (*¶56) *paragraph 56*

[4] *See* ¶*55-57 of Docket 17-95 Report & Order and Further Notice of Proposed Rulemaking (*¶55-57)

innovation and flexible use of satellite technology. The Commission's action provides new opportunities to expand broadband availability to consumers on the move. It is important that the Commission continue to promote these objectives internationally. The U.S. proposal should not stifle the ability to deploy ESIM but should take a balanced approach to allow for the operation of ESIM while protecting allocated services from unacceptable interference. This is best accomplished by adopting View A as the U.S. proposal.

Respectfully submitted,

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